REMARKS

Claims 1-3, 7-10, 12 and 13 are pending in the present application. Claims 7-9 are withdrawn from consideration. Claims 1, 2 and 10 are herein amended. Claims 4-6 and 11 are herein cancelled. No new matter has been entered.

Claim Rejections - 35 U.S.C. § 112

Claim 13 was rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Office Action takes the position that the limitation "the untreated copper foil does not have deposited nodules" is not supported in the specification.

Applicant respectfully submits that the limitation is supported in the original disclosure of the application. The specification of the present application points out that the untreated copper foil having knob-like projections is "further roughening treated" by running a predetermined current through the foil for a predetermined time in an electroforming bath. (*See e.g.*, specification, pages 7-8.) One of ordinary skill in the art would understand that the untreated copper foil does not have deposited copper nodules and that the copper foil does have copper nodules after surface treatment. This is further supported by the disclosure in Wolski.

Wolski discloses that an untreated copper foil is subjected to surface treatment by depositing copper nodules. (Col. 3, lines 14-25.) The copper nodules are deposited on the copper foil as a result of the surface treatment for increasing the roughness. (Col. 3, lines 38-47.) The copper nodules are deposited by running an electric current through the foil. (Col. 3, lines 47-50.)

Applicant encloses additional documents further supporting that one of ordinary skill in the art would understand that an untreated copper foil does not have deposited nodules.

Enclosed Document A shows a regulation of copper foil of IPC. (IPC 4562, *Metal Foil for Printed Wiring Applications*.) At item 1.2.6 there is description about Bond Enhancement Treatment.

Enclosed Document B is information regarding a copper foil production method released on the website for Fukuda Metal Foil & Powder Co., Ltd. (http://www.fukudakyoto.co.jp/03product/f-denkai.html), which contains electron microscopic photos showing a treated surface and an untreated surface of a copper foil.

Enclosed Document C shows a published paper of PC Expo 2006. (*Profile-Free Copper Foil for High Density Wiring and High Frequency Application*, Hitachi Chemical.) At page 2, line 4, there is described that "the conventional copper foil has a roughened adhesive surface to keep good peel strength"; and at page 2, line 12, there is described "the surface profile of the firmer copper foil is very low because it needs no roughening process on the adhesive surface."

Enclosed Document D shows a published article in Japanese concerning surface treatment of a copper foil, wherein Fig. 3 shows electron microscopic photos of a treated surface and an untreated surface of a copper foil.

The specification of the present invention discloses that an untreated copper foil is a copper foil that has not been subjected to roughening treatment, and thus, one of ordinary skill in the art would understand that the untreated copper foil as recited in the claims does not have deposited nodules.

Withdrawal of the rejection under § 112 is requested.

Claim Rejections - 35 U.S.C. § 102 and 103

Claims 1, 2, 4, 12 and 13 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over **Wolski** (US 5,834,140); claims 1, 2, 4, 12 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Wolski** in view of **Fatcheric** (US 5,679,230); and claims 3, 5, 6, 10 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Wolski** in view of **Fatcheric**.

Favorable reconsideration is requested.

A. Rejection based on Wolski

(1) Applicant respectfully submits that Wolski does not teach or suggest:

> An electrodeposited copper foil, comprising:
>
> a matte side surface, said matte side surface having a surface shape that is smooth with intermittently spaced ***knob-like projections***;
>
> wherein the surface roughness thereof is 2.2 to less than 4 μm, and the copper foil is ***an untreated copper foil***

as recited in claim 1.

Applicant previously pointed out that Wolski does not disclose knob-like projections on an untreated copper foil. (Amendment, January 23, 2008.) Specifically, Applicant stated that the Office Action incorrectly compares the deposited copper nodules of Wolski to the knob-like projections of an untreated copper foil since an untreated copper foil does not have deposited copper nodules. Furthermore, Applicant pointed out that the limitation "untreated copper foil"

should be given patentable weight since the cited copper foil having deposited nodules in Wolski is structurally distinguishable from an untreated copper foil.

The Office Action dated March 11, 2008 maintains that the limitation reciting that the copper foil is an untreated copper foil is a process limitation which is given no patentable weight, and maintains that the copper nodules deposited in a treatment process in Wolski correspond with the "knob-like projections" as recited in claim 1. (Office Action, pages 8-9.)

However, as previously pointed out, the Office Action incorrectly gives no patentable weight to the limitation "untreated copper foil." The MPEP states that:

> The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product.

MPEP § 2113, citing *In re Garnero*, 412 F.2d 276 (CCPA 1979).

The Office Action appears to assume that the only structural difference between a treated and an untreated copper foil is the surface roughness characteristic. However, an untreated copper foil also does not have deposited copper nodules. Deposited copper nodules are the result of a treatment process. Wolski at col. 3, lines 18-24 states:

> Among these ***treatments***, there is a ***process of depositing copper [n]odules*** on the surface of the foil for enhancing bonding strength of the foil when it is laminated to an insulating resin substrate. This process is called to as a ***bond enhancing treatment***. The copper foil subjected to the above treatments is called a ***treated copper foil*** 8 and can be used for a copper-clad laminated board.

(Emphasis added.)

Thus, the cited copper foil having deposited copper nodules in Wolski is structurally distinguishable from an untreated copper foil as recited in claim 1.

Since an untreated copper foil does not have deposited copper nodules, the Office Action incorrectly cites the deposited copper nodules in Wolski as corresponding to the "knob-like projections" of the copper foil as recited in claim 1.

Wolski does not teach or suggest an untreated copper foil with knob-like projections. Therefore, Wolski does not teach or suggest the elements as recited in claim 1.

(2) Regarding claim 12, Applicant respectfully submits that Wolski does not teach or suggest a copper foil as recited in claim 1 wherein the electrolyte for producing the copper foil contains sodium 3-mercapto propoane sulfonate and hydroxyethylcellulose.

The Office Action specifically cites the copper foil of comparative example 1 in Wolski as corresponding with the copper foil as recited in the present claims since comparative example 1 is a copper foil that has a surface roughness of 3.3 μm before treatment. (Office Action, page 3.) However, for comparative example 1, neither sodium 3-mercapto propane sulfonate nor hydroxyethylcellulose were used in the electrolyte. (*See* Wolski, Table 1.) Wolski discloses an electrolyte including sodium 3-mercapto propane sulfonate and hydroxyethylcellulose in examples 1, 3 and 4 (Table 1); however, in examples 1, 3 and 4 the resulting roughness was outside the roughness range as recited in claim 1 (Table 2).

(3) Regarding claim 13, the Office Action states that the claim does not further structurally limit the product and that it would have been obvious to omit the copper nodules if enhanced bonding strength is not desired. (Office Action, page 5.)

Applicant respectfully submits that the Office Action incorrectly disregards this limitation of claim 13. Claim 13 recites that the copper foil does not have deposited copper nodules which is a structural limitation. In addition, if the copper foil in Wolski omits the deposited copper nodules, then the copper foil would not have "knob-like projections" as defined by the Office Action. The Office Action cites the copper nodules of Wolski as corresponding to the knob-like projections as recited in claim 1. (Office Action, page 3.) Thus, if the copper nodules are omitted, then the copper foil no longer has "knob-like projections."

B. Rejection based on Wolski in view of Fatcheric

The Office Action also rejects claims 1, 2, 4, 12 and 13 based on Wolski in view of Fatcheric. The Office Action states that assuming that the projections in Wolski are not intermittent, then Fatcheric is cited for disclosing intermittent projections. (Office Action, page 5.) The Office Action cites Fatcheric for disclosing a surface shape that is smooth with intermittently spaced knob-like projections. (Office Action, page 5 citing Fatcheric, Abstract.) Specifically, the Office Action cites the fine nodular metal deposit of Fatcheric for disclosing the intermittently spaced knob-like projections.

Fatcheric discloses that the fine nodular metal deposit is the result of a treatment process. Fatcheric states:

> In one aspect, the invention is an electrolytically formed copper foil ... which has been ***electrolytically treated*** on the matte side ***to deposit micro nodules*** of a metal or alloy, preferably copper or a copper alloy, which do not increase the measured roughness, but nevertheless do increase adhesion to a substrate.

(Col. 3, lines 11-17, emphasis added; *See also* Abstract.)

Thus, the Office Action cites fine or micro nodules in Fatcheric which were deposited on the copper foil in a treatment process for corresponding to the intermittently spaced knob-like projections of an untreated copper foil as recited in claim 1.

As stated above regarding the rejection based on Wolski, an untreated copper foil does not have deposited copper nodules. Knob-like projections of an untreated copper foil cannot correspond to deposited copper nodules since deposited copper nodules on a copper foil are structures formed by a treatment process.

Neither Wolski nor Fatcheric teach or suggest an untreated copper foil with knob-like projections. Therefore, Wolski in view of Fatcheric does not teach or suggest the elements as recited in claim 1.

For at least the foregoing reasons, claims 1-3, 10, 12 and 13 are patentable over the cited references. Accordingly, withdrawal of the rejections of claims 1-3, 10, 12 and 13 is hereby solicited.

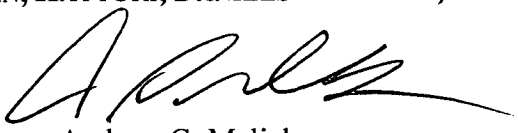
In view of the aforementioned amendments and accompanying remarks, Applicant submits that the claims, as herein amended, are in condition for allowance. Applicant requests such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



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Attachments: IPC 4562, *Metal Foil for Printed Wiring Applications*
Website of Fukuda Metal Foil & Powder Co., Ltd.
Profile-Free Copper Foil for High Density Wiring and High Frequency Application, Hitachi Chemical
Japanese Article